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Empirical analysis of the lending decisions of Chinese formal financial institutions in rural areas

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Abstract

This empirical research is aimed to analyze the development of microfinance principles in the lending decisions of the two Chinese formal rural institutions, namely the commercial banks and credit cooperatives. For this reason, it is tested if loan purposes are oriented towards social goals, and if the guarantee requirements for the farmers are too strict. The regression results show that this implementation is only partial. Farmers have to provide too strong guarantees that they cannot afford, and this does not allow the great majority of them to get access to the credit.

Keywords: Chinese commercial banks; rural credit cooperatives; microfinance; Tobit model

1. Introduction

For centuries, agricultural development has been a popular topic for discussion in economic literature. The economists have reached a consensus that rural markets can be improved with a proper credit structure. The analysis has been further developed over the last decades, along the progressive modernization of the financial system and the expansion of microfinance in the developing countries.

The objective of this empirical research is to analyze the development of the key microfinance principles in the lending decisions of Chinese formal institutions.

Chinese rural market is characterized by a basic dualism consisting of formal and informal finance. We commonly refer to the latter as transactions which are unregulated by a central authority. In the cases of Chinese villages, the most frequent informal agents are relatives and neighbours of the farmers, whilst the two main formal institutions are commercial banks and rural credit cooperatives.

Microfinance is the branch of economic science we commonly refer to as the provision of financial services to the economic agents which are generally considered not solvent. These actions are aimed to promote economic choices in order to improve social welfare and, moreover, to give trust people who actually did not have it, usually just for not having any kind of savings. This means that the strong guarantees that may be required in normal banking business, and that cannot be afforded by rural households, are not requested for getting access to a loan.

This paper's literature contribution is a critical analysis of the current microfinance development in rural China, based on these two crucial tasks of the loan purposes and

guarantee requirements. In order to achieve this goal, the analysis will be performed from a database survey gathering personal information of farmers.

The father of microfinance is a Bengali Professor, Muhammad Yunus: he believed that an easy access to the credit was the only way out, for low social class, from their frustrating life conditions. This practice is finding a growing interest, in particular among economists who not believe in the impossibility of combining together the concepts of finance, commonly considered as strictly related with individual profit, with ethics, in this case intended as common interest and improvement of social and economic welfare of low social class. Nowadays, microfinance finds a general consensus in a wider range, and it is developed in several Asiatic countries.

This paper proceeds as follows. Section II presents a brief literature review, and in section III, after the description of the Chinese institutional setting, two testable hypotheses for the empirical research are set up. Section IV, V and VI present respectively of the data source, econometric models used, and the economic interpretation of the results obtained. Finally, section VII contains concluding remarks of the paper.

2. A brief literature review

It is well established in economic literature that households in developing countries are quite heterogeneous in terms of endowments, production and consumption[1]. Conning and Udry (2005) examine rural finance in emerging markets and propose policies in order to promote financial intermediation. In a similar study done by Lohlein and Wehrheim

[1] This information is exploited in many empirical researches, and usually used in order to compare rural studies across developing countries.

(2003), the role of rural credit cooperatives in Russia are observed, suggesting government policy options aimed to increase the efficiency of their activity.

Other important analyses of rural finance markets in Asiatic countries are given by Kochar (1997) and Duong and Izumida (2002), respectively for India and Vietnam. The results show that individual household information belonging to farmers, such as their reputation, actually does affect institutional lending behavior.

Concerning the asymmetric information issue, that Chinese formal institutions have to face, Akerlof (1970) is the first economist to propose a simple model about it. Through his work, he generated a new broad study area. Hoff and Stiglitz (1990) explain segmentation into formal and informal markets typically observed in developing countries, mainly due to asymmetric information problems and screening costs. Stiglitz (1991) discovers that moral hazards and adverse selection have the potential to significantly reduce financial market operations and, in extreme cases, generate a complete market failure. As we will see through the paper, Stiglitz findings are very appropriate even in Chinese rural context.

In the literature, we also have to take into account studies on rural development policies, and credit constraints. Yaron and Benjamin (1997) demonstrate that for a greater rural finance development it is much more efficient to promote policies and legal reforms than lowering interest rates on loans. Guirkinger and Boucher (2008) show that the presence of institutional credit constraints have a large negative impact on the efficiency of resource allocation. Furthermore, Menkhoff and Rungruxsirivorn (2009) test the efficacy

of “village funds”, a recent microfinance program introduced in the rural Thailand: their main empirical finding is that it helps in reducing credit constraints.

Concerning Chinese economic literature, rural credit markets have attracted growing studies in particular since the 1990s. Xie (2003) studies the recent reforms of Chinese rural credit cooperatives, encountering issues such as rural financial depression. Xiaoshian (2005) examines the Chinese regulatory environment for microfinance, recommending government policy, in particular related to loan interest rates, aimed to a further development. Tongquan (2008) deepens the Chinese legal framework of microfinance, and demonstrate that it is not appropriate for the rural growth and prosper.

Zhou and Zhou (2009) analyze dualism structure in the Chinese market, demonstrating that formal and informal finance consist of different lending behaviors and guarantee requirements. By studying the impact of informal operations in microfinance, Turvey and Kong (2009) provide an interesting description of the relationship between Chinese informal and formal finance institutions.

3. Institutional settings and testable hypotheses

3.1 Institutional settings

Chinese rural market is generally considered a business with high risk and low profit margins. Important problem that commercial banks and rural credit cooperatives have to face consists of asymmetric information: this is one of the main reasons why they require different conditions than informal finance. These differences concern in particular the

guarantee provisions. Empirical studies and surveys (Zhou and Zhou, 2009) show that the most common form of a guarantee is a simple verbal agreement. This practice is mainly due to the fact that farmers are responsible for maintaining a positive reputation within the villages, which is enough to ensure the future repayment of loans. Moreover, the informal agents, who in particular are the relatives and neighbors of the farmers, usually tend to lend to them in order to give resources for consumption purposes.

In contrast, a similar structure cannot take place in formal finance, where institutions face stronger asymmetric information problems, since in-depth data is in this case required by the lenders. As an example, they may experience a situation that puts them in moral hazard, having loans requested for entrepreneurial objectives that are turned into consumptions. Part of this problem is dealt with by screening farmers that can be classified as "the active poor", meaning that they somehow have an entrepreneurial potential regarding the activity. People who are not in this category are unable to receive a loan, and microfinance cannot give them assistance.

For all these reasons, this empirical research will be solely oriented towards the analysis of formal institutions.

3.2 Testable hypotheses

We are going to investigate two crucial aspects that institutions consider when making a lending decision: namely, the reasons behind the choices of the borrower according to the information available, and the guarantee which is actually required. In order to achieve this goal, we set up two testable hypotheses, which will be exploited in order to understand whether the lending agents do in fact follow ethical criteria in their

actions.

Hypothesis 1: Chinese rural formal finance institutions lend to farmers in order to improve social welfare.

Lending decision criteria followed by formal institutions depend on several factors, including the socio-cultural context of a particular country or environment. One of the key questions we may ask is whether Chinese rural institutions consider the non-monetary impact of their loans. As it might be in common with other Asian countries, this hypothesis is very important since it can lead to a significant issue that does not view profit as the primary goal of their lending decision.

Hypothesis 2: Chinese rural formal institutions do have strong guarantee requirements.

This second hypothesis points out the particular structure of the lending decision characteristic of Chinese institutions. Given the high risk in rural markets, we test the level of guarantee which has to be provided by the households to the commercial banks and rural credit cooperatives.

4. Data source and descriptive analysis

The database hereby used is provided by a household survey conducted by the Tsinghua and HSBC Rural Economic Study Center in Tsinghua University; a total of 4920 households, in sixteen different regions, have been surveyed. The data gathered contains personal situations of Chinese farmers from 2006 to 2008.

The focus of this study is the loan amount received by each family surveyed

respectively from the commercial banks and from the rural credit cooperatives. In Table 1 it is presented the summary statistics. As we can see, the median of the loan amount among the surveyed farmers, for both institutions, is zero Yuan. This means that most farmers have difficulties in getting access to the credit. Moreover, other demonstration of the lack of the proper credit structure is given by considering the average loan amount of the farmers who actually got access to the loan, which is 1469 and 6469 Yuan respectively from commercial banks and rural credit cooperatives. Similar average amounts of the loan are too low. In fact, as we can see in Table 1, they only represent approximately only 4% and 13% of the yearly gross income of the households.

5. Models and variables presentation

The first results that will be presented are got through OLS regression. In this empirical research, we specify this model as follows:

$$Y = \alpha + \beta_1' X_1 + \beta_2' X_2 + \beta_3' X_3 + U$$

where Y, the dependent variable, stands for the loan amount received by commercial banks and rural credit cooperatives. Then, X_1, X_2 and X_3 are the explanatory variables, and represent respectively the information available on the farmers, the purpose of loan and the guarantee form provided. Moreover, β_1, β_2 and β_3 measure the impact on Y respectively of X_1, X_2 and X_3, while U is the error term

Individual information of farmers include their age, gender, years of education, number of family members, size of both house and field, production equipment and investments, income from field and from doing other business, gross income for the

current year. Moreover, belonging to this category are also included some data concerning the farmer's family, such as the age of family leader, the number of family member living with the farmer, and whether at least a family member attends school or works outside the hometown.

Purpose of the loan is also a key issue when incurring into a lending decision by the borrower. Implications on the institution's behavior are tested when incurring in loans for helping the household in producing, building a new house, finding another work, buying clothes and food, electronics or cars, medicals, improving social connections, or for the repayment of old loans purposes.

The third category of variable concerns the guarantee provision. Starting with believes declared by the surveyed farmers as loan too costly or to be afraid of loan repayment notices (i.e. a raise in interest rates), this category includes whether the farmer cannot provide any kind of guarantee, he has not been able to repay old loans, he does not have any other possibility of asking elsewhere for a loan, or he is a member of a credit union. In particular for the guarantee form, indicators will be if it is a written notice, an oral agreement, if collateral is requested, and if the guarantee is provided by a third person or by a credit union.

More detailed explanation of each independent variable may be found in Exhibit 1 in the Appendix.

After OLS regression, the analysis is implemented with Tobit estimator. In this case, it is specified as:

$$Y = \begin{cases} Y^* = \alpha + \beta_1' X_1 + \beta_2' X_2 + \beta_3' X_3 + U & \text{if } Y^* > 0 \\ 0 & \text{if } Y^* = 0 \end{cases}$$

where each variable is defined in the same way as for OLS, with the only exception that Tobit model makes the assumption that error term $U\sim(0;\sigma^2)$.

The reason why the analysis is implemented through Tobit regression is that OLS actually may lead to misleading inference, since it ignores the censoring property for the data: therefore, with Tobit estimator, the accuracy of our estimations is improved.

6. Results discussion

Table 2.1 and 3.1 show OSL regression results of the regressions on the loans from commercial banks and credit unions respectively. While Table 2.2 and 3.2 are Tobit regression results for the two samples.

Firstly, we examine the criteria followed for the borrower choice, according to the available information on the households. Here is where, differently from the loan purposes and guarantee requirements, the two institutions present the most remarkable differences.

As for commercial banks, production equipment and investments have respectively a positive and negative impact on the credit access, since their lending decisions are strictly linked with the households' production facilities, and negatively correlated with how much a farmer actually produced the year before. As a matter of fact, these two variables are significant at 95% and 90% confidence level. Slightly different discourse concerns rural credit cooperatives: when lending, they tend to help farmers according to how much they produced the year before, compared to their production equipment, gross income of the farmer and income from field of the farmer, that therefore have a negative impact on the loan concession. On that we can also assert more sure: these latter variables are all

significant at 99% confidence level.

This means that commercial banks want to help rural households with clear unexploited production potentiality, while rural credit cooperatives provide funds to the borrowers according to how well they used their resources compared to their endowments. This empirical finding lead us a to a very interesting conclusion: even though they adopt different criteria for establishing the borrower, once it is chosen, improving household production is a very important loan purpose for both formal financial institutions. As a matter of fact, production has the strongest significance among all the elements of the vector of loan purposes. As we can see in Table 2.2 and 3.2, the Tobit estimator gave us very strong values, respectively of 159.42 and 117.70.

Other relevant loan purpose is the education of kids. The slope coefficients are 100.02 and 42.69 for commercial banks and credit unions respectively. For this reasons, if the most educated person in the family has several years of schooling, the household gets easier access to the loan, (in particular for rural credit cooperatives, where this coefficient is significant at 95% level). In fact, highest education in the family is the most useful screening mechanism that formal institutions have for making sure that loans will be actually oriented for financing education.

Summarizing these first results, we can already assert that our first hypothesis is verified, since the loan purposes for funding production activity and education of kids are certainly crucial in order to improve social welfare. As we can notice in Tables 2.2 and 3.2, these two elements are also significant at 99% level for both institutions. Moreover, also the strong significance of the loan for helping farmers in housing (whose coefficients, with Tobit estimator, are respectively 136.15 and 45.45) confirms this hypothesis: formal

institutions tend to lend for social goals, rather than the personal farmer objective of consumption due to a lack of funds.

Apart from these common points, further discussion can be made by observing how commercial banks and rural credit cooperatives present slightly different lending decision, concerning the other loan purposes. In fact, rural credit cooperatives do care much about profit rather than commercial banks: providing a fund to repay old loans is important, while commercial banks prefer, rather than this, to lend for helping farmers to improve their social connections. Tobit estimator gives us values for the latter two slope coefficients respectively of 69.28 and 127.63, significant at 95% and 90% confidence level. This reason may be found in the fact that, as in the case of Russia (Lohlein and Wehrheim, 2003), Chinese rural credit cooperatives present a dual nature activity. In fact, they are "self-help organizations", meaning that they must be aimed to participate at the economic life of the country, but, at the same time, keeping the orientation to the profit objective. Whilst being state-owned, commercial banks activities in rural areas are fully aimed to meet the central government policy of support to the agriculture.

Now, in order to see whether formal institutions have implemented microfinance criteria, we have to examine the level of guarantee that they require for getting access to the credit. As we can see in Tables 2.2 and 3.2, Chinese farmers have to provide solid guarantees. In particular, we can remark the strong significance of the collateral provision (whose slope coefficients with Tobit estimator are 131.72 and 84.74 for the two formal institutions), and of the belonging to a credit union, which is requested by rural credit cooperatives given the slope coefficient of. Enforcing the strength of our results is the fact that all these latter elements are significant at 99% confidence level. Moreover, common

issue between the two institutions is that they do not accept forms as verbal agreements, which are instead typical of informal finance agents (Zhou and Zhou, 2009). Tables 2.2 and 3.2 show us the negative coefficient for both institutions of the oral agreement, which is significant at 99% level. The main reason behind this strict requirement is the necessity of avoiding borrowers' information asymmetries that may generate. Therefore, even our second hypothesis is verified.

As such, we may expand our considerations, in a wider scale, in order to discuss further the social welfare improvement. As farmers are a low social class, we can see that the lending decision of the formal institutions slightly recalls the basic idea of microfinance concerning just for the purposes of the loan. But, due to these strong guarantee requirements, it is current opinion that the non-monetary impact, which is basic for the microfinance science, is not as relevant as other Asian countries.

7. Concluding remarks

In this empirical research, we discovered that Chinese formal institutions have not integrated at all microfinance culture in their lending activities. The causes behind this implementation, which is only partial, may be found in several factors. For example, rural borrowers incur in the same credit constraints as in other countries, with the additional limit given by the Chinese transition from a planned into a market economy (Lin, 2004). For all these reasons, the farmers are asked to provide a guarantee that they cannot afford, which therefore limits their access to credit.

Even though some improvement over the last years can be noticed, in particular after

the 2003 rural credit cooperative reforms, these progresses are not yet appropriate in order to pursue an efficient rural development. Perhaps over the next years, with a complete expansion of these reform programs nationwide, rural households may have higher facilities in the credit access. With a further rural development, farmers, due to their poor life conditions, would not be forced to turn the loans for consumption purposes. This would lead also to a consequent reduction of social costs, given by the reduction of the moral hazard issues.

Presently, guarantees requested by banks and rural credit cooperatives are still too strong. Given the goal of the institution to survive, microfinance cannot lead to the instability of the whole financial system. Many economists believe that there in fact is not a linear relation between choices aimed to ethic goals and a raise in costs and risks by the lending institution. With the implementation of new mechanisms, it might be possible to overtake this problem, often considered as a trade-off, between decisions in ethic directions and profit maximization. That is why that among the possible solutions that can be suggested, there may be the integration of a new culture backgrounds, and consequently new procedures within the agents, or the creation of ad-hoc microfinance institutions. Of course, we should not forget that it is necessary to have an appropriate legal framework aimed to facilitate this integration, which is currently lacking.

In this way, it would be possible to keep the necessary condition of profitability, but at the same time overtaking the historical inefficiency about activities aimed to the ethic purpose of improving the welfare of low social class. Through these solutions, microfinance culture could be better integrated in the institutions, and the challenge of the rural development might be achieved more efficiently in the future.

8. References

Akerlof, George A. 1970. "The Market for Lemons: Quality Uncertainty and the Market Mechanism." *The Quarterly Journal of Economics*, 84(3): 488-500.

Bao Duong, Pham and Izumida, Yoichi. 2002. "Rural Development Finance in Vietnam: A Microeconometric Analysis of Household Surveys", *World Development*, 30: 319-35.

Capriglione, Francesco. 1997. *"Etica della Finanza e Finanza Etica."* Roma-Bari, Laterza.

Conning, Jonathan and Udry, Christopher. 2005. "Rural Financial Markets in Developing Countries." *Economic Growth Center Yale University*, 914.

Daripa, Arup. 2007. "Optimal Collective Contract Without Peer Information or Peer Monitoring." *Journal of Development Economics*, 86: 147-63.

Giné, Xavier, Jakiela, Pamela, Karlan, Dean and Morduch, Jonathan.2006. "Microfinance games." *World Bank Policy Research Working Paper*, 3959.

Hoff, Karla, and Stiglitz, Joseph E. 1990. "Imperfect Information and Rural Credit Markets - Puzzles and Policy Perspectives." *The World Bank Economic Review*, 4(3): 235-50.

Kochar, Anjini. 1997. "An Empirical Investigation of Rationing Constraints in Rural Credit Markets in India." *Journal of Development economics*, 53: 339-71.

Li, Xia, Gan, Christopher and Hu, Baiding. 2011. "Accessibility to microcredit by Chinese rural households." *Journal of Asian Economics*, 22: 235–46.

Lohlein, Daniela and Wehrheim, Peter. 2003. "The Role of Credit Cooperatives in Rural Russia." *Gloros Policy Paper.*

Menkhoff, Lukas and Rungruxsirivorn, Ornsiri. 2009. "Village Funds in the Rural Credit Market of Thailand." *Proceedings of the German Development Economics Conference*, Frankfurt, 45.

Rosenberg, Richard, Gonzalez, Adrian, and Narain, Sushma. 2009. "Are microcredit interest rates excessive?" *CGAP Brief.*

Salanié, Bernard. 2000. *"The Economics of Contracts: A Primer."* London: The MIT Press.

Stiglitz, Joseph E. 1991. "Peer Monitoring and Credit Markets." *The World Bank Economic Review,* 4(3): 351-66.

Stiglitz, Joseph E. and Weiss, Andrew. 1981."Credit Rationing in Markets with Imperfect Information." *American Economic Review,* 71: 393-410.

Tongquan, Sun. 2008. "The Policy and Legal Framework for Microfinance in China". *Rural Development Institute of CASS.*

Turvey, Calum G., and Kong, 2009, "Informal Lending Amongst Friends and Relatives: Can Microcredit Compete in Rural China?" *China Economic Review,* 21: 544–56.

Vigano, Laura, Bonomo, Luciano, Vitali, Paolo. 2004. "Microfinance in Europe." *Giordano dell'Amore Foundation Working Paper.*

Xiaoshan, Du. 2005. "The Regulatory Environment for Microfinance in China." *Rural Development Institute, Chinese Academy of Social Sciences.*

Xie, Ping. 2003. "Reforms of China's Rural Credit Cooperatives and Policy Options." *China Economic Review,* 14: 434– 42.

Yaron, Jacob. 1992. "Successful Rural Finance Institutions." *World Bank Discussion Paper*, 150.

Yaron, Jacob and Benjamin, McDonald. 1997. "Developing Rural Financial Markets", *Finance & Development*, 32.

Yifu Lin, Justin. 2004. "Lessons of China's Transition from a Planned Economy to a Market Economy." *WSPiZ and Tiger Distinguished Lectures Series, 16.*

Yunus, Mohammad. 1999. *"Banker to the Poor: Micro-Lending and the Battle against World Poverty."* New York: PublicAffairs.

Zhou, Tianyun and Zhou, Xianbo. 2009. "Dualism Structure, Information Choice and Lending Behaviour in Chinese Rural Credit Market." *Unpublished.*

Table 1: Summary statistics

	Mean	Median	Max	Min	St. Dev.	Skewness	Kurtosis
loan _comm_banks (in 1000 Yuan)	1,47	0	1000	0	24,80	28,62	962,42
loan_cred_union (in 1000 Yuan)	6,47	0	3000	0	62,46	35,20	1585,09
int_age	44,75	45	87	0	14,54	-0,50	0,90
age_fam_leader	45,97	46	86	0	14,14	-0,90	2,25
years_educ	7,32	9	90	0	4,14	2,52	53,53
family_size	4,37	4	19	0	1,70	1,49	6,57
highest_educ_family	9,14	9	72	0	4,63	0,74	15,63
prod_equiments (in 1000 Yuan)	23,70	0	10000	0	241,41	29,19	1033,48
size_house	148,45	100	8205	0	411,59	17,35	326,91
size_field	9,94	4	705	0	30,74	10,01	141,69
other_land	0,41	0	305	0	9,66	26,86	755,05
inc_field (in 1000 Yuan)	5,92	2	400	0	15,01	11,26	213,55
inc_business (in 1000 Yuan)	7,19	0	506	0	20,08	12,01	237,23
gross_inc (in 1000 Yuan)	44,17	20	6000	0	182,09	19,74	490,74
prod_investment (in 1000 Yuan)	10,12	0	3000	0	101,03	20,31	492,52

Note: Dummy variables are not included in Summary statistics

Table 2.1: OLS regressions for commercial banks

Model	$Y= \alpha+\beta'_1X_1+\beta'_2X_2+U$	$Y= \alpha+\beta'_1X_1+\beta'_3X_3+U$	$Y= \alpha+\beta'_1X_1+\beta'_2X_2+\beta'_3X_3+U$
Number of observations	3399		
Dependent variable	loan_comm_banks		
int_age	-0,042	-0,047	-0,047
age_fam_leader	0,060	0,058	0,067
years_educ	0,067	0,069	0,052
gender	0,628	0,389	0,433
family_size	0,069	0,097	0,072
highest_educ_family	0,053	0,043	0,040
school_elsewhere	-0,220	-0,362	-0,207
work_elsewhere	-1,71*	-1,508	-1,566*
prod_equiments	0,014***	0,014***	0,014***
size_house	0,000	0,000	0,000
size_field	0,016	0,014	0,014
other_land	-0,010	-0,027	-0,023
inc_field	-0,030	-0,028	-0,033
inc_business	0,039*	0,042*	0,040*
gross_inc	-0,002	-0,002	-0,002
prod_investment	-0,010*	-0,010*	-0,011**
loan_clothing_food	-0,596		-0,536
loan_housing	3,621**		3,998*
loan_work_elsewhere	-0,596		-0,157
loan_educ_kids	0,161		0,272
loan_production	3,095***		2,495**
loan_electronic_cars	-2,277		-2,258
loan_medical	-0,426		0,018
loan_connection	0,116		0,436
loan_repay_loans	-2,098		-3,257
_cons	-1,963		
no_capab_repay_loan		0,234	0,193
cannot_provide_guare		-1,180	-1,150
too_costly		-2,189	-2,214
afraid_loan_notices		-0,326	-1,770
nowhere_to_borrow		-1,243	-1,176
member_credit_union		0,494	0,277
guar_notice		-2,490**	-2,702**
guar_person		5,124***	4,888***
guar_union		1,818	1,088
guar_collateral		1,853	1,172
oral_agreeement		-1,479	-1,912*
_cons		-0,395	-1,086
R^2	0,022	0,025	0,029

***significant at 1% level; **significant at 5% level;* significant at 10% level

Table 2.2: Tobit regressions for commercial banks

Model	$Y= \alpha+\beta'_1X_1+\beta'_2X_2+U$	$Y= \alpha+\beta'_1X_1+\beta'_3X_3+U$	$Y= \alpha+\beta'_1X_1+\beta'_2X_2+\beta'_3X_3+U$
Number of observations	3399		
Dependent variable	loan_comm_banks		
int_age	-1,512	-1,805*	-1,719
age_fam_leader	2,074*	1,795	2,525**
years_educ	2,097	1,415	1,382
gender	14,388	-1,655	-0,734
family_size	-6,700	-5,323	-7,824
highest_educ_family	4,192*	4,599**	3,677
school_elsewhere	-24,920	-0,816	-13,800
work_elsewhere	-59,770*	-48,979*	-49,525*
prod_equiments	0,117*	0,110**	0,117**
size_house	-0,024	-0,015	-0,015
size_field	0,088	0,108	0,092
other_land	-0,546	-0,653	-0,488
inc_field	-0,495	-0,574	-0,982
inc_business	0,488	0,419	0,459
gross_inc	0,061	0,050	0,076
prod_investment	-0,505	-0,407	-0,530*
loan_clothing_food	-15,636		-24,839
loan_housing	124,870***		136,152***
loan_work_elsewhere	98,137		137,641
loan_educ_kids	89,897***		100,025***
loan_production	190,822***		159,419***
loan_electronic_cars	-171,413		-187,209
loan_medical	11,855		17,277
loan_connection	103,698*		127,628**
loan_repay_loans	-162,295		-139,009
_cons	-580,340		
no_capab_repay_loan		2,949	-23,546
cannot_provide_guare		-916,750	-1044,349
too_costly		-1156,152	-1117,595
afraid_loan_notices		88,962	34,960
nowhere_to_borrow		-102,537	-86,295
member_credit_union		-12,466	-17,753
guar_notice		-50,029*	-65,483**
guar_person		77,822*	63,133**
guar_union		99,943*	59,608**
guar_collateral		164,588*	131,717***
oral_agreeement		-64,509**	-89,115***
_cons		-459,041	-535,940

***significant at 1% level; **significant at 5% level;* significant at 10% level

Table 3.1: OLS regression for rural credit cooperatives

Model	$Y=\alpha+\beta'_1X_1+\beta'_2X_2+U$	$Y= \alpha+\beta'_1X_1+\beta'_3X_3+U$	$Y= \alpha+\beta'_1X_1+\beta'_2X_2+\beta'_3X_3+U$
Number of observations	3399		
Dependent variable	loan_cred_union		
int_age	0,043	0,030	0,053
age_fam_leader	-0,013	-0,011	-0,007
years_educ	-0,167	-0,179	-0,211
gender	2,616	1,113	1,049
family_size	0,957*	1,110**	0,965*
highest_educ_family	0,481**	0,400*	0,411**
school_elsewhere	-2,073	-2,030	-1,705
work_elsewhere	-3,260*	-2,872	-2,487
prod_equiments	-0,034***	-0,034***	-0,034***
size_house	-0,002	-0,001	-0,001
size_field	0,006	0,007	0,001
other_land	-0,040	-0,076	-0,068
inc_field	-0,100	-0,095	-0,115*
inc_business	0,050	0,056	0,053
gross_inc	-0,059***	-0,060***	-0,060***
prod_investment	0,447***	0,448***	0,446***
loan_clothing_food	-2,903		-2,431
loan_housing	0,765		-0,014
loan_work_elsewhere	-4,452		-3,089
loan_educ_kids	-1,462		-1,655
loan_production	10,866***		7,212***
loan_electronic_cars	8,925		9,590
loan_medical	-2,289		-1,963
loan_connection	-2,682		-2,791
loan_repay_loans	26,137***		22,672**
_cons	-5,833		
no_capab_repay_loan		-1,246	-0,569
cannot_provide_guar		1,703	1,487
too_costly		0,069	-0,293
afraid_loan_notices		1,515	-1,149
nowhere_to_borrow		-1,855	-1,625
member_credit_union		6,999***	6,496***
guar_notice		-2,154	-2,494
guar_person		5,095*	3,897
guar_union		6,752**	4,272
guar_collateral		22,360***	20,604***
oral_agreeement		0,029	-0,047
_cons		-5,893	-7,088
R^2	0,360	0,372	0,376

***significant at 1% level; **significant at 5% level;* significant at 10% level

Table 3.2: Tobit regressions for rural credit cooperatives

Model	$Y= \alpha+\beta'_1X_1+\beta'_2X_2+U$	$Y= \alpha+\beta'_1X_1+\beta'_3X_3+U$	$Y= \alpha+\beta'_1X_1+\beta'_2X_2+\beta'_3X_3+U$
Number of observations	3399		
Dependent variable	loan_cred_union		
int_age	0,633	0,449	0,788
age_fam_leader	-0,622	-0,817**	-0,672
years_educ	-0,126	-0,020	-0,419
gender	28,124***	10,733	13,398
family_size	0,536	3,956*	1,571
highest_educ_family	3,357***	2,538***	2,239*
school_elsewhere	-9,391	-4,169	-5,893
work_elsewhere	-6,059	2,042	3,186
prod_equiments	-0,038**	-0,031**	-0,036***
size_house	-0,004	-0,004	-0,006
size_field	0,197*	0,118	0,056
other_land	-0,619	-0,660	-0,537
inc_field	0,177	0,312	0,132
inc_business	-0,191	-0,195	-0,160
gross_inc	-0,064**	-0,085***	-0,076***
prod_investment	0,508***	0,544***	0,518***
loan_clothing_food	23,166		20,084
loan_housing	44,497*		45,151***
loan_work_elsewhere	8,901		18,540
loan_educ_kids	42,364**		42,691***
loan_production	150,346*		117,70***
loan_electronic_cars	71,488*		79,643***
loan_medical	25,222*		27,727
loan_connection	8,820		10,676
loan_repay_loans	74,226*		69,281*
_cons	-273,917		
no_capab_repay_loan		8,472	8,657
cannot_provide_guar		-24,528	-25,761
too_costly		0,472	-6,636
afraid_loan_notices		-12,127	-73,389
nowhere_to_borrow		-39,048	-43,305
member_credit_union		65,351***	60,803***
guar_notice		-13,381	-21,783**
guar_person		71,964***	58,154***
guar_union		108,053***	71,881***
guar_collateral		102,018***	84,741***
oral_agreeement		-17,894**	-23,795**
_cons		-234,373	-285,547

***significant at 1% level; **significant at 5% level;* significant at 10% level

Appendix

Exhibit 1: Dependent and explanatory variables

loan_comm_banks	Loan amount by commercial banks (in 1000 Yuan)
loan_cred_union	Loan amount by rural credit cooperatives (in 1000 Yuan)
int_age	Age of the interviewed farmer
age_fam_leader	Age of the family leader of the interviewed farmer
years_educ	Years of education of the interviewed farmer
gender	Gender of the interviewee: 1 if male; 0 if female
family_size	Size of the family people living in the farmer's house
highest_educ_family	Years of education of the highest educated person in the family
school_elsewhere	1 if a family member is attending school outside the hometown; 0 otherwise
work_elsewhere	1 if a family member works outside the hometown; 0 otherwise
prod_equiments	Total value of the equipment available for production (in 1000 Yuan)
size_house	Size of the house of the farmer
size_field	Size of the field of the farmer
other_land	Hectares of farmer's land which is not the field where the farmer is used to work
inc_field	Income of the farmer from the field (in 1000 Yuan)
inc_business	Income of the farmer from doing business (in 1000 Yuan)
gross_inc	Value of the gross income of the farmer (in 1000 Yuan)
prod_investment	Total value of production investment of last year (in 1000 Yuan)
loan_clothing_food	1 if the farmer requests the loan for clothing and food; 0 otherwise
loan_housing	1 if the farmer requests the loan for housing; 0 otherwise
loan_work_elsewhere	1 if the farmer requests the loan for working elsewhere; 0 otherwise
loan_educ_kids	1 if the farmer requests the loan for making their kids studying; 0 otherwise
loan_production	1 if the farmer requests the loan for improving their production activity; 0 otherwise
loan_electronic_cars	1 if the farmer requests the loan for buying electronics; 0 otherwise
loan_medical	1 if the farmer requests the loan for improving their social connections; 0 otherwise
loan_connection	1 if the farmer requests the loan for improving their social connections; 0 otherwise
loan_repay_loans	1 if the farmer requests the loan for the repayment of old loans; 0 otherwise
no_capab_repay_loan	1 if the farmer believes he will not be able to repay the loan; 0 otherwise
cannot_provide_guar	1 if the farmer is not able to provide any guarantee; 0 otherwise
too_costly	1 if the farmer believes the loan is too costly; 0 otherwise
afraid_loan_notices	1 if the farmer declares to be afraid of bad notices about the repayment of the loan; 0 otherwise
nowhere_to_borrow	1 if the farmer has nowhere else where borrowing; 0 otherwise
member_credit_union	1 if the farmer is a member of a rural credit cooperative; 0 otherwise
guar_notice	1 if the guarantee has the form of a written notice; 0 otherwise
guar_person	1 if the guarantee is provided by a third person; 0 otherwise
guar_union	1 if the guarantee is provided by a guarantee union; 0 otherwise
guar_collateral	1 if the farmer provides a collateral as guarantee; 0 otherwise
oral_agreeement	1 if the agreement is reached verbally; 0 otherwise